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REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application are made obvious under the provisions of 35 U.S.C. §103. The Applicants believe that all of these claims are now in allowable form.

In addition, the Applicants' representative would like to thank Examiner Choudhury for kindly taking a substantial amount of time on March 27, 2007 to discuss the merits of the subject invention. The Applicants' representative is aware of the time constraint that is placed on the Examiner and is appreciative of the Examiner's willingness to devote such large quantity of time to discuss the case on the merits.

I. REJECTIONS OF CLAIMS 1-14 UNDER 35 U.S.C. § 103

The Examiner rejected claims 1-14 under 35 U.S.C. §103 as being obvious over Gupta, Sandeep K.S. and Srimani, Pradip K. ("An Adaptive Protocol for Reliable Multicast in Mobile Multi-hop Radio Networks," (IEEE, 1999)) hereinafter referred to as "Gupta") in view of the Humblet et al. patent (United States Patent No. 5,671,357, issued September 23, 1997, hereinafter referred to as "Humblet"). In response, the Applicants have amended independent claim 1, from which claims 2-13 depend, as well as independent claim 14, in order to more clearly recite aspects of the present invention.

In particular, the Applicants respectfully direct the Examiner's attention to the fact that Gupta and Humblet, singly or in any permissible combination, fail to teach, show or suggest the novel invention of forwarding a topology update via a path tree rooted at the source of the update, as claimed by the Applicants in amended claims 1 and 14.

By contrast, Gupta teaches the use of a core-based shared tree to send multicast messages. That is, Gupta teaches that the source of a message forwards the message to a core node of a multicast group, and that the core node then forwards the message to other members of the multicast group in accordance with a "shared multicast tree rooted at the core node" (*See, e.g.*, Gupta, Section 3.1.1, Page 3, third full paragraph,

emphasis added). Thus, messages are sent and received over a single, shared tree regardless of source (or, for all sources).

The Applicants clearly claim the step of rooting a path tree at each node that is a source of an update message, and receiving update messages from the sources over these path trees. That is, the source of an update message forwards the update message to other nodes using a tree that is rooted at the source itself. Thus, when "a sender [source] wants to multicast [disseminate] a message [an update message] to members of a group", the sender does not need to "send[ ] a MULTICAST message to [a] core node of the group ... [to] initiate[ ] dissemination of the message", as is taught by Gupta (*See*, Gupta, Section 1, Page 2, first full paragraph). The source simply sends the message, using the tree rooted at the source.

Moreover, Gupta does not teach, show or suggest the dissemination of network topology updates. Although Gupta does discuss that changes to network topology (*e.g.*, link failure, nodes joining/leaving the network, etc.) can affect the reliability of multicast message delivery, Gupta is directed to a process for ensuring delivery of multicast messages in spite of such topology changes. That is, Gupta is primarily concerned with ensuring delivery of multicast messages in the presence of (potentially disruptive) topology changes. Gupta does not discuss, however, the need to disseminate information about the topology changes themselves to the members (nodes) of a network.

At best, Gupta teaches that "[n]ode movements [topology changes] are detected via link failures" (*See*, Gupta, Section 3.5, Page 10, fourth full paragraph, emphasis added). That is, a node is not informed of a topology change via an update message (*e.g.*, received over a path tree), but rather through the node's own detection of a failed link. Moreover, once the node detects the failed link, the node does not initiate an update message to other nodes in order to disseminate information about the failed link, but rather "floods [a] forwarding region with all unstable multicast messages" (*See*, Gupta, Section 3.5, Page 10, fourth full paragraph). Nodes that do not witness (*e.g.*, detect through link failure) changes in topology continue to forward multicast messages as usual (*e.g.*, in accordance with the shared core-based tree, *See*, Gupta, Section

3.1.1, Page 4, Example 3). Thus, it is possible that some nodes may never even know about the topology change, and certain will not receive an update message containing information about the topology change, as claimed by the Applicants.

Humblet fails to bridge these gaps in the teachings of Gupta. Specifically, Humblet also fails to teach, show or suggest forwarding a topology update via a path tree rooted at the source of the update, as claimed by the Applicants in amended claims 1 and 14. Although Humblet does discuss the need to broadcast messages containing topology information to nodes in a network, Humblet does not teach or suggest how such messages are delivered to the nodes. Rather, Humblet teaches when such messages are disseminated, through the use of a timer. As such, Humblet also fails to teach, show or suggest the concurrent and independent reception of update messages over a plurality of path trees, as claimed by the Applicants in amended claims 1 and 14.

Thus, as discussed above, Gupta and Humblet, singly or in any permissible combination, fail to disclose or suggest forwarding a topology update via a path tree rooted at the source of the update, as positively claimed by the Applicants. Applicants' independent claims 1 and 14 positively recite:

> 1. In a multi-hop network including a plurality of nodes that each maintains a table of network topology, a method for disseminating topology and link-state information over the multi-hop network, comprising:
>
> maintaining a path tree for each source node in the network that can produce an update message, each path tree having that source node as a root node and further having a parent node and zero or more children nodes;
>
> receiving update messages from the parent nodes in accordance with the path trees rooted at the respective source nodes that originated the received update messages, the update messages including information related to links in the network and being received concurrently and independently on their respective path trees;
>
> updating the table of network topology in response to the information in the update messages received via the path trees rooted at the source nodes; and
>
> forwarding the update messages to children nodes, if any, in accordance with the path trees rooted at the source nodes that originated the update messages in response to the information in the received update messages, if it is determined that the update information for the network is globally updated across the plurality of nodes. (Emphasis added)

14. A network, comprising:

a plurality of nodes in communication with each other over communication links, each node maintaining a table of network topology and a path tree for each source node in the network that can produce an update message, each path tree having that source node as a root node and further having a parent node and zero or more children nodes,

wherein one of the nodes (i) receives update messages from the parent nodes in accordance with the path trees rooted at the source nodes that originated the received update messages, the update messages including information related to links in the network and being received concurrently and independently on their respective path trees, (ii) updates the table of network topology in response to the information in the update messages received via the path trees rooted at the source nodes, (iii) and forwards the update messages to children nodes, if any, in accordance with the path trees rooted at the source nodes that originated the update messages in response to the information in the received update messages, if it is determined that the update messages should be forwarded to the children nodes, such that topology information for the network is globally updated across the plurality of nodes. (Emphasis added)

Thus, as Gupta and Humblet, singly or in any permissible combination, fail to teach, show or suggest the novel invention of forwarding a topology update via a path tree rooted at the source of the update, the Applicants respectfully submit that claims 1 and 14, as amended, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Dependent claims 2-13 depend, either directly or indirectly, from claim 1 and recite additional features thereof. As such and for at least the same reasons set forth above, the Applicants submit that claims 2-13 are also not made obvious by the teachings of Gupta in view of Humblet. Therefore, the Applicants submit that claims 2-13 also fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

II. STATEMENT OF SUBSTANCE OF INTERVIEW OF MARCH 27, 2007

In response to the Interview Summary dated April 2, 2007, the Applicants submit the following statement regarding the substance of the interview:

A) No exhibits or demonstrations were conducted.

B) Claim 1 was discussed.

C) The Gupta reference was discussed.

D) Substantive amendments to claims 1 and 14 were proposed. Specifically, the Applicants proposed amending claims 1 and 14 to make more explicit the fact that a path tree exists for each source of an update, and that updates may be received by a node over multiple path trees in a concurrent and independent manner.

E) The Examiner's Interview Summary correctly describes the substance of the interview.

F) No other pertinent matters were discussed.

G) The Examiner and the Applicants did not reach an agreement concerning the claims as reflected in the proposed claim amendment.

III. CONCLUSION

Thus, the Applicants submit that none of the presented claims is made obvious under the provisions of 35 U.S.C. § 103. Consequently, the Applicants believe that all of the presented claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the maintenance of the final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

4/23/07

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